

**GONATOPUS BARTLETTI OLMI [HYMENOPTERA: DRYINIDAE]  
IN MÉXICO: A PREVIOUSLY UNREPORTED PARASITOID OF THE  
CORN LEAFHOPPER *DALBULUS MAIDIS* (DELONG & WOLCOTT)  
AND THE MEXICAN CORN LEAFHOPPER  
*DALBULUS ELIMATUS* (BALL) [HOMOPTERA: CICADELLIDAE]**

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*Abstract.*—The dryinid *Gonatopus bartletti* Olmi was reared from parasitized *Dalbulus maidis* (DeLong & Wolcott) and *Dalbulus elimatus* (Ball) collected in México. This is the first record of this dryinid in México.

*Key Words:* corn leafhopper, *Dalbulus*, dryinids, *Gonatopus*, México

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Although the corn leafhopper, *Dalbulus maidis*, is mainly found at low to mid elevations, and the "Mexican corn leafhopper," *Dalbulus elimatus*, is mainly found at high elevations (Barnes 1954, Nault in press), both species are pests of maize in México. These insects are capable of vectoring 3 maize stunting pathogens: maize rayado fino virus (MRFV), corn stunt Spiroplasma (*Spiroplasma kunkelii* Whitcomb et al.), and maize bushy stunt mycoplasma-like organism (Nault 1985). Yield losses due to MRFV transmission by *Dalbulus maidis* have been estimated at 40–50% of the weight of a mature ear in maize cultivars adapted to Central America (Gámez and León 1985). In newly developed cultivars losses can reach 100% (Gámez and León 1985).

Little is known about natural enemies (Madden et al. 1986) or biological control of *Dalbulus* spp. In México, remnants of *Dalbulus* spp. were found in webs of the spider *Tetragnatha* sp. (Araneae: Tetragnathidae). Feeding by this spider on *Dalbulus* was confirmed in the laboratory (F.

E. Vega, unpublished data). In the laboratory, *Hippodamia convergens* Guérin-Méneville nymphs and adults fed on adult *Dalbulus* (F. E. Vega, unpublished data). In Nicaragua, *Ectatomma ruidum* (Formicidae: Ponerinae) has been observed to prey on *Dalbulus maidis* (Perfecto 1989) while two fungi, *Metarhizium anisopliae* and *Beauveria bassiana*, are known to infect *Dalbulus maidis* (S. Gladstone, personal communication). So far, there is no information of *Dalbulus* egg predators or parasitoids.

Pipunculids, strepsipterans, and dryinids are known to attack leafhopper nymphs and adults (Waloff 1975), but in México, only dryinid parasitism has been observed (by F. E. Vega). In El Salvador, a dryinid identified as *Agonatopus* sp. was found attacking *D. maidis* (Quezada 1979), although it is suspected to be *Gonatopus bartletti* Olmi (M. Olmi, personal communication). *G. bartletti* was first reported from Puerto Rico (Bartlett 1939, Olmi 1984), but Olmi (personal communication) now has records from Nicaragua, Venezuela, Bahamas, and Belize. We present the first record of *G. bartletti* (Hymenoptera: Dryinidae) in México.

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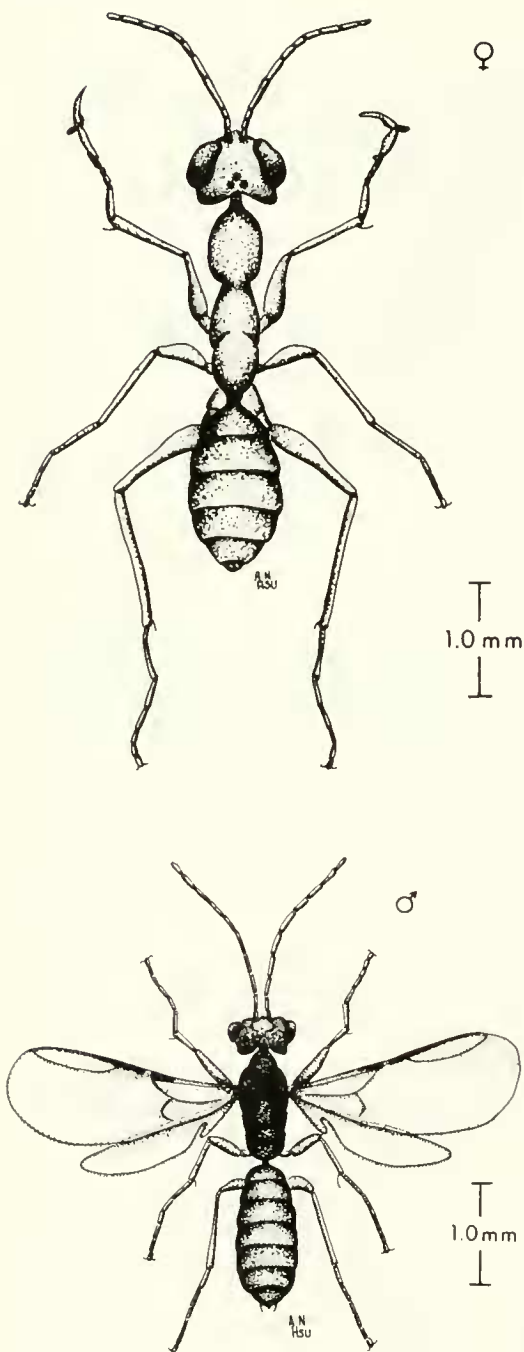
## MATERIALS AND METHODS

To identify the parasitoids attacking *D. maidis* and *D. elimatus*, leafhoppers were collected in maize fields in 6 Mexican states: Jalisco, Guanajuato, Querétaro, México, Morelos, and Veracruz. Although other plant hosts could have been sampled for *Dalbulus* spp. (e.g. *Tripsacum* and the teosintes), we presumed it most logical to begin a search in maize agroecosystems within the widest geographical area we could sample. Those insects showing symptoms of parasitism (e.g. a black spot in the abdomen or a bloated abdomen) were separated from the rest with a manual aspirator and taken to the laboratory where they were placed in plastic cups with plastic lids with a screen-covered rectangular hole. The cup contained about 1.5 cm of soil and fresh maize leaves which were replaced daily.

## RESULTS

Five specimens identified as *Gonatopus bartletti* Olmi (Dryinidae: Gonatopodinae) were reared: two apterous females from 2 parasitized *D. maidis* and one winged male and 2 apterous females from 3 parasitized *D. elimatus* (for a complete description of the Dryinidae, see Olmi 1984). Parasitized insects were collected at the Colegio de Postgraduados in Montecillos, state of México, and along Road 43, 19 km west of Celaya in the state of Guanajuato. Parasitism by dryinids was observed in the state of Jalisco in the Pacific coast and eastward to the state of Veracruz on the Gulf coast.

Only parasitoids in their late stages of development emerged, as indicated by the big sac on the host's abdomen (Waloff 1974). Before the parasitoid larva emerged, the leafhopper exhibited sluggish behavior, and its wings and elytron had been pushed upwards by the parasitoid sac. A few minutes before larval emergence the leafhopper clung to a leaf blade and died. After the parasitoid larva emerged, it moved around the cup, and spun a cocoon, either in the soil, in the leaf, or on the walls of the cup.



Figs. 1-2. *Gonatopus bartletti* Olmi. 1. Female. 2. Male.

Table 1. *Dalbulus* species found in México.

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<i>D. quinquenotatus</i>
<i>D. chiapensis</i>
<i>D. maidis</i>
<i>D. tripsacoides</i>
<i>D. charlesi</i>
<i>D. gelbus</i>
<i>D. guzmani</i>
<i>D. longulus</i>
<i>D. guevarai</i>
<i>D. elimatus</i>

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## DISCUSSION

México is the putative center of origin for ten of eleven *Dalbulus* species (Table 1) (Nault and DeLong 1980, Triplehorn and Nault 1985). Due to the number of *Dalbulus* species, their host plants, and the habitats in which these can be found, it can be argued that there should be a wider diversity of natural enemies of *Dalbulus* in México than elsewhere. A search in maize plantations in six Mexican states revealed only *Gonatopus bartletti* Olmi. Although the importance of this dryinid as a biological control agent is not known, a study by Waloff (1974) suggests that dryinids have the potential to control leafhoppers. Using different leafhopper species she determined that a female *Gonatopus sepsoides* Westwood could potentially parasitize 177 leafhoppers over her lifetime.

Further research on rearing methods, and the bionomics of this dryinid will determine the feasibility of the use of *Gonatopus bartletti* Olmi as a biological control agent. An extended search for natural enemies of all other *Dalbulus* species may uncover other parasitoids and predators which might act against *Dalbulus maidis* and *Dalbulus elimatus*.

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